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5. A lichen is a phylogenetically derived morphological unit.
6. Lichens form groups of natural series phylogenetically derived from distinct prototypes. Lichens have, therefore a polyphyletic origin.
7. Lichens differ from the fungi morphologically as well as physiologically.

The following are the general conclusions at which Reinke arrives:

1. Although fully accepting Schwendener's theory, lichens are phylogenetically, morphologically and physiologically wholly distinct from fungi, and it is therefore inconsistent to arrange them under fungi.

2. Lichens form a natural group coequal in systematic importance with fungi and algae.

Since Reinke has written this paper Schwendener in a personal interview with E. L. Gregory * stated that he had no objection to the proposed plan of classification. Tubeuf, † as well as other recent authors, expresses the opinion that the lichen is an autonomous structure, a morphological unit. There are also strong objections, such as those cited by Lindau. ‡

A new *Gymnogramme* from Venezuela, with Remarks on some other Venezuelan Ferns.

BY B. D. GILBERT.

Last spring Dr. H. H. Rusby, Secretary of this club, and Mr. R. W. Squires, of Minneapolis, made a botanical trip to Venezuela together and brought back with them a large collection of pressed plants, among which were about two dozen species of ferns. This fall Dr. Rusby placed the ferns in my hands for identification and it is found that although the collection is small it con-

* Gregory, E. L. Notes on the Classification of Lichens. Bull. Tor. Bot. Club. 23: 361. 1896.

† Tubeuf, K. F. Pflanzenkrankheiten, p. 102. Berlin. 1895.

‡ Lindau, G. Die Beziehung der Flechten zu den Pilzen. Hedwigia, 34: 195-204. 1895.

tains a number of choice things. Of course there are several common species which grow throughout the Antillean and South American tropics, such as *Polypodium Phyllitidis* and *P. Plumula*, *Dryopteris trifoliatum* and *D. macrophyllum*, *Nephrolepis acuta* and *N. exaltata*, *Asplenium serratum* and *A. cicutarium*. But along with these are others by no means so common, some of which are deserving of special mention.

The first of these in importance as well as interest is a new *Gymnogramme* belonging to the sub-genus *Selliguea*. Mr. Squires was particularly interested in collecting ferns and other cryptogams, and this species was gathered by him on the last day of the expedition, after all their other specimens were packed up. As Dr. Rusby says: "It was fired into a bale of paper on the fly, and dried itself. Two or three times afterward it was dropped aside and all but lost; and it seems quite remarkable that it should have survived for a description." Fortunately the specimens were finely fruited and complete in every respect; and they enable me to present herewith a full description of the plant.

GYMNOGRAMME (SELLIGUEA) HETEROPHLEBIA n. sp.

Rhizome wide-scandent, the younger part thickly clothed with long ($\frac{1}{4}$ in.) lanceolate acuminate bright brown scales, the stipes springing directly from the rhizome, the older portion of rhizome bearing short branches on which the stipes are tufted.

Stipes single or two to three in a cluster from the same short branch of rhizome, when single $\frac{3}{4}$ to $1\frac{1}{2}$ in. apart, $\frac{1}{4}$ to 1 in. long, clothed at base with same scales as rhizome.

Rachis distinct from base to tip stramineous naked. *Frond* 5–8 in. long, $\frac{7}{8}$ – $1\frac{1}{2}$ in. broad, lanceolate-ovate point generally acuminate, but sometimes round and blunt, surfaces naked, edge entire or slightly wavy, lower part of frond shortly narrowed into stipe; color light brown, texture membranaceous.

Veins of two kinds, primary ones raised, very distinct, running in wavy line from rachis two-thirds of way to edge. Also a finer series forming irregular areoles between the main veins with occasional free veinlets included, exterior veinlets free and clavate just within the edge.

Sori extending in two series from base to tip, one sorus in

each space between the primary veins situated half way between the rachis and edge oblique, one to three lines long, one line wide.

The affinity of this species is with *G. membranacea* HK., a native of the Malay and Philippine Islands. It differs from that species in having a short and stramineous stipe instead of one that is black and 2–6 in. long; also in the character of the veins, the primary veins not reaching the edge and the intermediate ones being much less distinct. Such a wide geographical separation as lies between the Philippines and South America need not of necessity be a bar to identity of species, since we have such examples as *Asplenium filix-foemina* and *Dryopteris mollis* that extend almost the world around. But these instances are quite rare; and in the genus *Gymnogramme* I am not aware of a single species that is common to both the eastern and western hemispheres.

This fern enjoys the distinction of being the only species, in the section of *Selliguea* to which it belongs, that is found in the western hemisphere. Out of 21 known species of *Selliguea*, including this, only 4 are natives of the new world, and of these only one occurs in any abundance. The fact that *Gymnogramme heterophlebia* has never been detected before is good evidence that it is a rare plant; for although new species of ferns are still discovered occasionally, South America has been pretty thoroughly ransacked and any fern that has hitherto escaped observation may be safely ranked among the rarities of that family.

This species happily illustrates the duplication of venation in different genera. If the sori were round instead of long the species would be a good example of the sub-genus *Phymatodes* in *Polypodium*, and would stand not far from *Phymatodes persicariaefolium* Schrad.

Another exceedingly interesting species in this collection is *Adiantum olivaceum* Baker. This belongs to the sub-genus *Hewardia*. In 1840 John Smith, of the Royal Botanical Gardens at Kew, then acknowledged to be one of the ablest pteridologists of his day, read a paper before the Linnaean Society and published a description in Hooker's *Journal of Botany*, in which he represented *Hewardia* as an entirely new genus from Guiana, which he dedicated to his friend Robert Heward, a Jamaica botanist of that pe-

riod. The pinnules of the original *Hebardia* are from 4 to 8 in. long, and are characterized by having a continuous involucre all around the edge. The involucre, however, is that of *Adiantum*, and when Sir Wm. Hooker came to publish his *Species Filicum* in 1858 he stated that he could "not see that it is agreeable to nature to separate a genus of ferns on account of the mere anastomosing of the veins of the pinnae." By that time another species of *Adiantum* with reticulated veins had been discovered on the Pacific side of tropical America, and Hooker only noted the two by putting them in a section by themselves. But ten years later, when the *Synopsis Filicum* was issued, he made a sub-genus of *Hebardia*, founded on the venation, and included two other species, having long but interrupted sori. One of these was the fern now collected by Rusby and Squires, which was originally named by Mr. Baker. All of these four species belong to Guiana, although *A. olivaceum* has now been found in Venezuela, and *A. dolosum* occurs in Jamaica and on the continent from Guatemala to Brazil. The last named is the only one of the *Hebardiae* that can be regarded as at all common, while *A. olivaceum* is a rare and very desirable species.

There are specimens of three arborescent ferns in this collection, viz.: *Alsophila blechnoides* Hooker; *Hemitelia grandifolia* Spreng.; and *Hemitelia Guianensis* var. *Parkeri* Hook. In Hooker's *Species Filicum* he was inclined to regard *H. Parkeri* as distinct from *H. Guianensis*; but before publishing the *Synopsis Filicum* he had received a large suite of specimens from South America and became satisfied that the two supposed species were only slight varieties of one and the same thing. *H. Parkeri* is distinguished by its more abundant hairs and by a larger number of sori which extend farther up the segments. *Hemitelia grandifolia* is found in the West India islands as well as on the continent. The caudex of these species is so low that they can be called "arborescent" only by courtesy and because they belong to a genus the majority of whose species are truly arborescent.

Another curious fern in the collection is *Dryopteris meniscioides* (Willd.) Unlike any other species of the *Aspidium* section, its barren and fertile fronds differ in form, the fertile being contracted and made narrower by the excessive production of fruit. The entire under side of the pinnae is filled with the sori in regular lines, and

as the indusia are persistent after the sporangia have burst out all around the edges of them, it forms a very pretty and unusual sight. On the upper side of the pinnae the moon-shaped veins are quite plainly to be seen similar to the veins of the genus *Meniscium* and these give the fern its specific name. Neither Hooker's *Species Filicum* nor the *Synopsis Filicum* mentions the crowded state of the mature sori which gives this fern such a remarkable appearance; but Grisebach, in his *Flora of the British West Indies*, notes it as one of the characteristic features.

The genus *Antrophyum* contains 18 acknowledged species, of which only six, or just one-third, are inhabitants of the western hemisphere. The species of this genus present quite as good an example as those of *Acrostichum* of the changes that may be rung on a simple fronded fern without cutting of any kind to break it up into separate sections. The forms are created by differences in breadth and width, by long or short stipes, by blunt or acute apices, and by possessing or not a distinct midrib. Two species are distinctly characterized by the last-named feature. The commoner one is *Antrophyum Cayennense* Kaulf., which grows in Cuba as well as on the continent. The other *A. subsessile* Kze., is much less abundant, and this is the one which Dr. Rusby's collection contains. As its name implies, its fronds are almost, and sometimes quite sessile, whereas *A. Cayennense* has a stipe from 1 to 3 in. long. Another feature is that while the *veins* are reticulated as in all the species of this genus, the *sori* follow the oblique forkings of the veins, but seldom the reticulations. It is an interesting species for study. I might go on and speak of other attractive ferns in this collection, but the ones already mentioned are the most important and infrequent, while the others are liable to be found in almost any series coming from the American tropics. Enough has been said, however, to show that this collection contains more good things than would ordinarily be found in such a limited number of species.

The following is a complete list of the ferns of this collection:

Hemitelia grandifolia Spr. Rocky banks in deep forest along Eleanor Creek (110).

Hemitelia Guianensis Parkeri Hook. Rocky soil along creek, Manoa (384).

Alsophila blechnoides HK. Rocky banks in deep forest along Eleanor Creek (123).

Trichomanes pinnatum Swz., with unusually large pinnae (385).

Trichomanes membranaceum L. Completely covering the vertical faces, on the down-stream side, of large rocks among the cascades on Eleanor Creek and in deep shade (365).

Adiantum Kaulfussii Kze. Steep hillsides in heavy forests along Eleanor Creek (375).

Adiantum tetraphyllum Willd. With the last (374).

Adiantum (Hewardia) olivaceum Baker. With the last (376).

Pteris Kunzeana Agardh. With the last, but in dryer soil (373).

Asplenium serratum L. In rich mould about high ledges, in partially sunny places, along Eleanor Creek (372).

Asplenium cicutarium Swz. In rather dry locations on steep hillsides, in deep forest along Eleanor Creek (118).

Asplenium cuneatum Lam. On rocks in bed of stream in deep forest, Eleanor Creek (363).

Dryopteris meniscioides (Willd.) Kuntze. With the last (379).

Dryopteris trifoliata (L.) Kuntze With phenomenally small sori. Steep hillsides in deep forest, Eleanor Creek (383).

Nephrolepis exaltata Schott. Pendant from the axils of palm leaves, Sacupana (368).

Nephrolepis acuta Presl. On decaying logs in deep forest, Santa Catalina (386).

Polypodium piloselloides moniliforme Hook. Climbing shrubbery in partly cleared land, Santa Catalina (369).

Phegopteris tetragona megaloda (Schk). Forests about Santa Catalina (388).

Polypodium Phyllitidis L. Rich mould about high ledges, in sunny positions, Eleanor Creek (370).

Polypodium Plumula HBK. Pendant from axils of palm leaves, Santa Catalina (366). With unusually long fronds, more than 4 feet in length (367).

GYMNOGRAMME (SELLIGUEA) HETEROPHLEBIA n. sp. Climbing on tree-trunks, in deep forests about Santa Catalina (382).

Meniscium serratum Cav. On rocks in bed of stream, in deep shade, Eleanor Creek (378).

Acrostichum (Gymnopteris) alienum Swz. With the last (380).

Dryopteris propinqua (Br.). In the Synopsis Filicum this is made a variety of *N. unitum*, but it agrees with no *N. unitum* that I ever saw. Rocky banks of Eleanor Creek, in deep forest (128).

Dryopteris (*Sagenia*) *Martinicensis* (Spreng.) Kuntze. (*Aspidium macrophyllum* Baker.) Steep hillsides in deep forest, Eleanor Creek (381).

Antrophyum subsessile Kze. Dry hillsides about Menoa (371).

Nos. 364, 377, 380 and 401 are without fruit and not in a fit condition for determination.

Resemblance of an Insect Larva to a Lichen Fruit.

BY G. E. STONE.

During the past summer while examining the bark of some sickly Camperdown Elms I observed a number of bodies about $\frac{1}{8}$ inch in diameter, with a dark center and a drab lacerated foliaceous margin.

These bodies were considerably scattered over the trunk of the tree, they being confined largely, however, to the crevices caused by the irregularities of the bark. In taking a hasty glance at these bodies my first impression was that they were the apothecia of some lichen with which I was not familiar, although they had a marked resemblance in color, size and form to the apothecia of *Physcia hypoleuca*. In fact some of these bodies were attached to the thallus of species of *Physcia*, while others were simply attached to the bark, thus giving the appearance of a lichen fruit without a thallus. This feature impressed me as rather singular, as I had no previous recollection of seeing apothecia of this nature without a thallus. On closer examination, however, it could be seen that these bodies were not vegetable organisms, as piercing them with a sharp pointed stick soon revealed their animal characteristics. Indeed, so marked was the resemblance of these bodies to certain lichen fruit that it required some little observation before they could be discriminated.

On taking them to the College Insectary I soon learned that they were the larvae of an insect known to entomologists as the Imported Elm-leaf Beetle—*Gossyparia ulmi* Geoff—which has not been in Massachusetts but a few years.